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## The Bronze Birch Borer

By Harvey J. MacAloney<sup>1</sup>

The bronze birch borer, *Agrilus anxius* Gory, is an important factor in the decadence and death of paper birch and yellow birch. Shade and ornamental trees as well as forest trees are affected. This insect has been reported in Canada from Newfoundland to British Columbia and in the United States from Maine to Idaho. Outbreaks developed during the period of widespread birch dieback which continued in the Northeastern United States and Canada for 25 years beginning in the early 1930's. Although the borer is generally considered a secondary insect, populations built up in many dieback areas, and apparently healthy trees were attacked and killed.

### Hosts

The bronze birch borer attacks paper birch, *Betula papyrifera* Marsh.; yellow birch, *B. alleghaniensis* Britton; gray birch, *B. populifolia* Marsh.; western paper birch, *B. papyrifera* var. *commutata* (Reg.) Fern.; water birch, *B. occidentalis* Hooker; and sweet birch, *B. lenta* L. The horticultural cut-leaf weeping birches are susceptible to severe damage. The bronze birch borer has also been reported on beech and aspen, but evidence has shown that the species attacking aspen is the very closely related bronze poplar borer, *Agrilus liragus* Barter and Brown.

<sup>1</sup>Principal Entomologist (deceased), North Central Forest Experiment Station. The station is maintained at St. Paul, Minn., by the Forest Service, U.S. Department of Agriculture, in cooperation with the University of Minnesota.

### Description

The slender adult (fig. 1) is an olive-bronze beetle. A female is three-eighths to one-half inch long and has a coppery-colored head; a male is slightly smaller and has a greenish head.

The larva (fig. 2) has the wide second thoracic segment common to the flatheaded borers. When mature it is pearly white and about 1½ inches long. The pupa in the first stage is creamy white; as it develops, it gradually darkens until it assumes the adult color. The creamy-white oval eggs are about 1.5 millimeters long and 1 millimeter wide.



Figure 1.—An adult female. (Courtesy of G. W. Barter, Canada Department of Forestry)



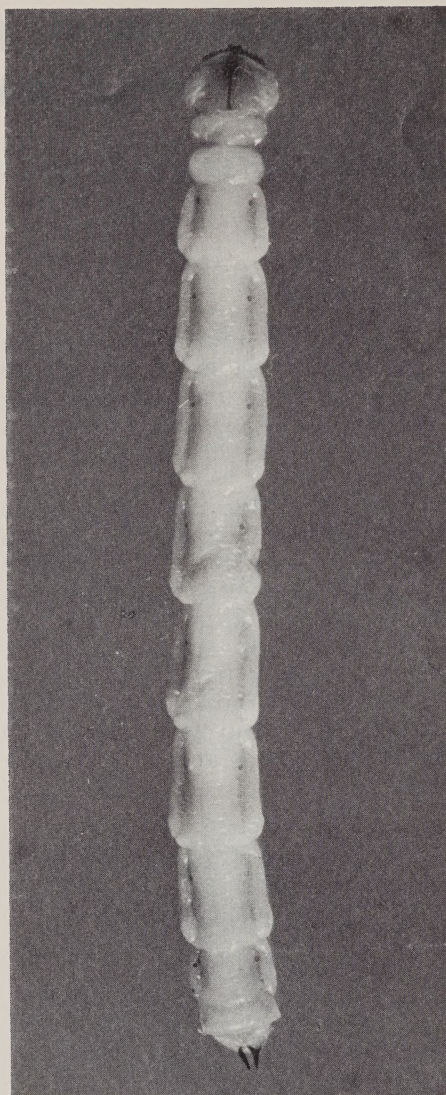


Figure 2.—A mature feeding larva. (Courtesy of G. W. Barter, Canada Department of Forestry)

## Habits

The first adults emerge in late May or early June. The emergence and flight periods, which partly depend on seasonal temperatures and locations, continue into August. The beetles feed on birch and aspen foliage and may live as long as 3 weeks. About 1 week after leaving the pupal chamber, the females begin laying eggs, depositing them in

groups in crevices, under loose flakes of bark, or in cracks in the bark.

The eggs hatch in about 2 weeks (fig. 3), and the larvae bore into the cambium layer, feeding there and in the outer wood layers. When cool fall weather prevails, they go into hibernation. Because of the long period of beetle emergence, all larval stages will be found in hibernation. The life cycle may be 1 or 2 years, depending on the date of egg laying, condition of the host, seasonal temperature, and climatic location. Furthermore, there is evidence that larvae must endure temperatures below freezing before they can develop to adults. Pupa-tion occurs in the spring.

## Evidence of Attack and Damage

Trees of low vigor and those weakened by drought or by exposure after logging are most susceptible to attack. The damage is caused by the larvae feeding in the phloem and xylem areas, thereby partially girdling the tree and interfering with the movement of sap and nutrients. The degree of injury depends on the larval population and its distribution in the tree. Successful attack usually begins in the crown of the tree in branches about three-fourths inch in diameter. From year to year the location of attack generally progresses downward into the bole. Removal of the bark will show the borer galleries (fig. 4).

Although eggs may be deposited in vigorous living trees, the larvae do not complete development; the galleries are healed over, causing scar tissue and ridges in the bark (fig. 5).

## Prevention of Attack and Damage

Excessive stand exposure and reduction in tree vigor are conducive to successful borer attack. Appropriate management practices will help reduce the deterioration of re-





Figure 3.—Larvae in eggs in an oviposition site just prior to hatching. (Courtesy of G. W. Barter, Canada Department of Forestry)



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Figure 4.—Mature larvae tunneling on the wood surface.

sidual paper birch and yellow birch that tends to occur after logging. These practices are described below :

1. In old-growth stands, clear cut overmature hardwoods to allow full development of the understory.

2. In a mixed-hardwood stand, remove the mature and defective trees up to no more than one-third of the merchantable volume. The younger trees should be disturbed as little as possible.

3. In pure even-aged paper birch, clear cut the stand as soon as it becomes merchantable.

4. In pole and sapling stands, prevent injury and exposure of young trees insofar as possible.

5. Keep shade trees in a vigorous condition. Because of the relatively shallow root system, the trees should





Figure 5.—Healed-over galleries in paper birch. Seven annual rings covered the galleries. (Courtesy of R. F. Anderson, Duke University)

be thoroughly watered, especially during drought or if the soil is sandy. Since the first evidence of attack is apparent in the upper crown, dead or dying branches should be pruned well back of the affected area. For planting, vigorous native stock is preferred because it is less susceptible to serious damage than the cut-leaf varieties.

In forest stands insecticides have not been effective control or preventive agents. Although shade or ornamental trees can be protected by heavy dosages of DDT in emulsion, this control measure is no longer advised because of the possibility of killing robins and other ground-feeding birds.

### Natural Control

Parasites and predators help to control birch borer populations. During one study in Maine, eight

species of larval parasites and two species of egg parasites were reported. Three larval parasites—*Atanycolus charus* (Riley), *Spathius similinus* Ashm., and *Phasgonophora sulcata* Westw.—were the most important. The percentage of parasitism varied greatly in the areas examined, reaching as high as 85 percent in one area in 1947. However, the average for the next 3 years in all areas was about 14 percent. In another study in New Brunswick, five species of parasites were found on 9 percent of the borers examined. In 1 year in Maine, various species of woodpeckers destroyed as much as 30 percent of the larvae.

### References

- The relation between host condition and attacks by the bronzed birch borer. ROGER F. ANDERSON. J. Econ. Entomol. 37: 588–596, illus. 1944.
- Studies of the bronze birch borer, *Agrilus anxius* Gory, in New Brunswick. G. W. BARTER. Can. Entomol. 89: 12–36, illus. 1957.
- On the identity of *Agrilus anxius* Gory and some allied species (Coleoptera: Buprestidae). G. W. BARTER and W. J. BROWN. Can. Entomol. 81: 245–249, illus. 1949.
- Post-logging decadence in northern hardwoods. R. C. HALL. Univ. Mich. Sch. Forest. and Conserv. Bull. 10, 61 pp., illus. 1933.
- Studies on extensive dying, regeneration, and management of birch. ROBLEY W. NASH and EDWARD J. DUDA. Maine Forest Serv. Bull. 15, 82 pp., illus. 1951.
- A study of organic factors concerned in the decadence of birch in cut-over lands in northern New England. PERLEY SPAULDING and H. J. MACALONEY. J. Forest 29: 1134–1149, illus. 1931.